

cedures did not dry the sigmoidoscope channels completely, thus leaving residual glutaraldehyde that was later sprayed onto rectal mucosa. In one patient, the glutaraldehyde was found in the tubing that connected the water bottle to the flexible sigmoidoscope.

Our three patients had the previously described features of glutaraldehyde proctitis. They were asymptomatic before the examination, and the results of the examination were normal. Yet, within hours of the examination, they had acute tenesmus and bloody diarrhea. They were treated with various medications, and all became well within a brief period of time and have remained so. We have since reviewed our cleaning protocol with staff nurses, making certain that the sigmoidoscope channels are flushed free of glutaraldehyde before drying.

Although glutaraldehyde proctitis is rare (we have recognized 3 cases in about 2,400 examinations over the past year), this complication of flexible sigmoidoscopy should be remembered to avoid diagnostic confusion with proctitis due to infection or inflammatory bowel disease. Patients may feel ill, but the prognosis is good, with complete recovery in a few weeks. Various methods of treatment have been used, including oral 5-aminosalicylic acid,⁹ antibiotics,¹⁰ steroid enemas,¹⁰ and combinations thereof. It is unclear as to which drug should be recommended, and some patients get well without any specific medication.

Staff members with the responsibility for cleaning instruments should be well trained, disciplined, and thorough.¹¹ Cleaning and disinfection methods should be reviewed periodically to prevent infection or mucosal damage from disinfectant solutions.

A new type of sigmoidoscope has recently been introduced that avoids cleaning procedures entirely (Vision System, Vision Sciences, Inc, Natick, Massachusetts). A core endoscope is inserted into an Endosheath that contains the usual three channels for biopsy and suction, air, and water. After its use, the Endosheath and its covering are discarded and a new sheath installed for the next patient. The cost-effectiveness and role of this new system are currently unclear.

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Adult Obstructive Sleep Apnea With Secondary Enuresis

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SLEEP APNEA represents a group of sleep-associated respiratory disorders. Apneas—defined as the cessation of airflow for at least 10 seconds—either central, obstructive, or mixed, may occur hundreds of times a night, resulting in asphyxia and disrupted sleep.¹ Although patients with the obstructive sleep apnea syndrome (OSAS) typically are middle-aged, obese men with a short, stout neck, a small posterior oropharynx, a history of snoring, and daytime somnolence, this condition may also be seen in children and nonobese adults.

Affected adults characteristically experience an insidious onset of daytime hypersomnolence. As the disorder progresses, they may have deteriorating memory, concentration, and judgment and personality and mood changes.¹ Family members and bed partners are often the first to recognize these changes, and they relate a history of loud snoring and periodic apneas or choking episodes.²

The mortality rate of untreated OSAS has been correlated with apneic events and may be as high as 37%.³ Untreated OSAS may lead to motor vehicle accidents, polycythemia, systemic hypertension, left ventricular dysfunction, myocardial infarction, cardiac arrhythmias, pulmonary hypertension, cor pulmonale, cerebrovascular accidents, and sudden death.^{2,4} Various less commonly appreciated symptoms have been reported, including night sweats, nocturia, nocturnal gastroesophageal reflux, decreased libido, impotence, morning headache, anoxic seizures, and hearing impairment.^{4,7} We present a case of obstructive sleep apnea in a patient who presented with the unusual manifestation of secondary enuresis.

Report of a Case

The patient, a previously healthy 26-year-old man, was seen for a general physical examination. A review of systems revealed an 18-kg (40-lb) weight gain over the preceding four to six months. In addition, the patient reported three episodes of enuresis occurring over the previous

(Brown MA, Jacobs MB, Pelayo R: Adult obstructive sleep apnea with secondary enuresis. *West J Med* 1995; 163:478-480)

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ABBREVIATIONS USED IN TEXT

CPAP = continuous positive airway pressure
OSAS = obstructive sleep apnea syndrome

month. He snored intermittently in his late teens, but the snoring had become louder over the past two to three years. Associated symptoms included bruxism, restless sleep, and daytime sleepiness. There was no history of tobacco, alcohol, or other drug use, cold intolerance, polyuria, polydipsia, dysuria, or depression. His family history was notable for two cousins who suffered strokes in their 30s.

On examination the patient weighed 106 kg (234 lb) and measured 168.5 cm (5 ft 6 in); blood pressure was 150/90 mm of mercury, and pulse rate was 82 beats per minute. The patient was alert and attentive. He had retroposition of the mandible and a narrow upper airway with enlarged tonsils, an elongated uvula, and redundant soft tissue of the oropharynx. His hard palate was elevated and narrow. The neck was thick and short. The neurologic and urologic examinations revealed no abnormalities. Laboratory studies elicited normal values for thyroid-stimulating hormone, free thyroxine, serum creatinine, electrolytes, blood glucose, and urinalysis. Over the next three months, he progressed to where he was having almost nightly enuresis.

Because of a suspicion of obstructive sleep apnea, a referral was made to the Stanford University Sleep Disorders Clinic. On nocturnal polysomnography, the patient was observed to have hypopneas and apneas with subsequent oxygen desaturation to 46% and a maximal esophageal pressure recording of -140 cm of water (normal, 10 cm of water). The patient had an average of 48.1 apneas per hour and a respiratory disturbance index of 75.1. Continuous positive airway pressure (CPAP) was titrated to 13 cm of water, with improvement in the patient's sleep. At a five-month follow-up, the patient reported improved daytime alertness and complete resolution of the enuresis.

Discussion

Obstructive sleep apnea is a major health problem in the United States, affecting at least 4% of middle-aged men and 2% of women aged 30 to 60 years.¹ Every primary care provider can expect to see patients with this condition. Patients are often overweight but can also be normal or underweight, particularly younger patients. Apneic episodes are characteristically much worse during rapid-eye-movement sleep because of the associated atonia of accessory respiratory muscles during this part of the sleep cycle. Risk factors for the disorder include a family history, craniofacial anomalies, obesity, and advancing age.^{2,6}

In children, secondary enuresis is a common, well-recognized presenting symptom of obstructive sleep apnea and improves with CPAP therapy or adenotonsillectomy.⁸ In adults, however, secondary enuresis due to obstructive sleep apnea is both less common and less

well recognized. This symptom in adults was not described in several recent reviews,^{1-3,9} but has been mentioned in others.^{4,5} Secondary nocturnal enuresis in adults with normal urologic evaluations has been noted in patients with obstructive sleep apnea since at least 1976¹⁰; yet, it is not well recognized by primary care providers. The differential diagnosis of adult secondary enuresis includes diabetes mellitus, lower urinary tract infection, degenerative neurologic conditions, or psychological factors.¹¹

Nocturnal enuresis was noted in 7% of 120 adult patients with OSAS in one series.⁵ The mechanism for nocturnal enuresis in this disorder is not clear and may be multifactorial. Patients have been shown to have increased urine production and salt excretion and tend to have more frequent nocturnal micturitions during sleep that normalize after treatment with nasal CPAP.⁷ This was related to possible increased atrial natriuretic peptide release or to decreased activity of the renin-angiotensin-aldosterone system.⁷ The increased urine production and salt excretion may explain why patients with obstructive sleep apnea also have symptoms of nocturia. Another possible explanation may lie in the hypercatecholamine state of apnea, producing a fight or flight autonomic surge with changes in the autonomic control of vesical muscle. Abnormal sleep, the associated confusion, and the increase in intra-abdominal pressure have also been speculated as causes of enuresis.⁵

The role of increased intra-abdominal pressure in nocturnal enuresis is supported by a case in which the authors measured the cystometric pressure in a middle-aged obese woman with severe obstructive sleep apnea and nocturnal enuresis.¹² Increased pressure waves were associated with the apneic events. A loss of posterior urethrovesical angle and an increase in intra-abdominal pressure caused by respiratory efforts against a closed upper airway were suggested to play an important role in the occurrence of enuresis in that case. The authors found a decreased number of apneic and enuretic episodes along with smaller cystometric pressure waves following weight loss and treatment with imipramine hydrochloride and acetazolamide. The sleep apnea and the enuresis did not completely resolve with the treatment, however, and a trial of CPAP was not reported.¹²

In our patient, the abnormal esophageal pressure was corrected with CPAP, with the enuresis resolving. The increased work of breathing against a narrow airway causes the increase in esophageal and intra-abdominal pressure. The mechanism of nocturnal enuresis in patients with obstructive sleep apnea may be the combination of increased urine production, with increased intra-abdominal pressure and distortion of the urethrovesical angle.¹² Decreasing the upper airway resistance corrects the pathophysiologic factors in nocturnal enuresis with obstructive sleep apnea.

Conclusion

Obstructive sleep apnea is a prevalent and possibly serious problem. There are a host of well-known clinical clues that should alert physicians to this diagnosis.

Secondary enuresis, a distinctly uncommon symptom in adults, should be considered a possible marker for this condition. If obstructive sleep apnea is confirmed, an extensive neurologic or urologic evaluation is probably not necessary.

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Toxic 'Sock' Syndrome Bezoar Formation and Pancreatitis Associated With Iron Deficiency and Pica

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PICA, OR THE INGESTION OF nonfood items, often occurs in patients with iron deficiency anemia and occasionally causes medical complications. We report a case of pica of an unusual substance, athletic tube socks, in a young woman and the subsequent development of a bezoar, pancreatitis, and pseudocysts.

Report of a Case

The patient, a 22-year-old woman, presented to an emergency department because for three weeks she had had nausea, vomiting, and dull left upper quadrant pain radiating to her back. On the day of admission,

the pain had become severe and "cramplike," and she noted blood in her vomitus. The patient said she had never had similar pain, pancreatitis, peptic ulcer disease, hepatitis, cholelithiasis, or abdominal trauma. She took no medications on a regular basis and did not smoke or drink alcohol. She had attended college and worked full-time. Of interest, the patient's boyfriend reported that she gnawed on and swallowed athletic-style tube socks to "relax." The patient considered this "a nervous habit" that began five months previously. She estimated that, at the time of admission, she consumed half a sock per evening. She denied having a history of psychiatric problems or of eating clay or other nonfood items. She also reported that she chewed on and swallowed clothing when she was in her teens.

On examination, she appeared anicteric and in considerable pain. Her abdomen was distended, with epigastric and left upper quadrant guarding and tenderness, but there were no signs of peritoneal inflammation, masses, hepatomegaly, or succussion splashes. The findings of a pelvic examination were notable for heavy menstrual flow. Her affect was appropriate.

Laboratory studies elicited the following results: pancreatic amylase, 3,795 U per liter; normal hepatic aminotransferase levels and bilirubin concentration; a leukocyte count of 11.6×10^9 per liter ($11,600$ per mm^3); hematocrit, 0.31 (31%); and a mean corpuscular volume of 67 fl ($67 \mu\text{m}^3$). An abdominal x-ray film showed an apparent large gastric mass.

The patient was admitted with the diagnoses of acute pancreatitis, microcytic anemia, pica, and a gastric mass. Esophagogastroduodenoscopy (EGD) revealed a metallic-colored gastric bezoar that extended into the duodenum and that was deemed too large for removal by EGD. An abdominal computed tomographic (CT) scan established extension into the third portion of the duodenum. An abdominal ultrasonogram showed ascites, an edematous pancreas, normal biliary and pancreatic ducts, and an unremarkable gallbladder. Twelve days into her hospital stay, the patient underwent an upper gastrointestinal series with a small bowel follow-through that revealed a persistent gastric bezoar and a separate cecal mass, interpreted as the displaced duodenal portion of the bezoar. A second EGD revealed only the gastric, but not the duodenal, portion of the bezoar. After receiving cathartics, the patient passed a fibrous mass. A gastrotomy for removal of the retained gastric bezoar was canceled because of the presence of pancreatic pseudocysts demonstrated on abdominal CT scan.

On evaluation for anemia, screening was negative for thalassemia. The serum iron level, transferrin saturation, and ferritin level were markedly diminished, and a zinc:protoporphyrin heme ratio was elevated, consistent with severe iron deficiency anemia. A consulting nutritionist found the patient's diet before admission lacking in iron intake.

A team of consulting psychiatrists found no history of a psychiatric disorder and that the patient had been a well-

(Adler AI, Ols camp A: Toxic 'sock' syndrome—Bezoar formation and pancreatitis associated with iron deficiency and pica. *West J Med* 1995; 163:480-482)

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